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Title: "A SOLID COSMETIC COMPOSITION"

Field of the Invention

The present invention relates to solid cosmetic compositions for application as, for example, lipstick, blush, eye shadow, stick base, lip protectors (either colorful or colorless), deodorants, perfumes, and others.

Background of the Invention

There are many cosmetic compositions that are used for coloring and protecting lips, eyes, faces, etc.

As far as lipsticks are concerned, for example, those used at present are cosmetic compositions containing structural agents such as waxes, which are products traditionally used by the consumers. However, these products are heavy, because, when applied to the lips, they are noticed, since they form a film of translucent color, without a perfect and intense covering right at the first application.

Other types of lipsticks that use mixtures with linear structural agents exhibit a non-satisfactory spreadability, and one feels the friction of the lipstick while passing it on one's lips.

As it is known, lipsticks are a complex mixture of solids, semisolids and liquids, such as waxes and emollients that, as time passes, often exudes and undergo oxidation, rendering the appearance and odor of such a product unsatisfactory.

On the other hand, lipsticks with a high concentration of emollients have the problem of flowing through the lips' edges, in addition to having low fixation power.

Many of these problems related to a poor fixation of the product and its unpleasant feeling on the skin also occur with other forms of presentation of solid cosmetic compositions such as blushes, eye shadows, stick-bases, deodorants and the like.

Therefore, it is an objective of the present invention to provide a solid cosmetic composition that can be applied in the form of a bullet or a stick, which can provide the user with a feeling of not being using any product.

Summary of the Invention

The present invention relates to a solid cosmetic composition comprising, as a structure agent, a combination consisting of a saturated straight-chain polymer and an agglutinating agent for this polymer.

5 Brief Description of the Drawings

Figures 1 and 2 show images of the cosmetic composition of the invention compared with known compositions that are scanned from samples tested (in replicate) by sliding on a universal assay machine.

10 Figure 3 shows images obtained by stereomicroscopy of the samples assayed by controlled sliding with an approximate 30-time enlargement.

Figure 4 shows an image obtained by transmission optical microscopy on Vitro-SkinTM of a sample analyzed with an approximate 100-time enlargement.

15 Figures 5 to 9 contain scanning electronic micrograph images of several analyzed samples.

Detailed Description of the Invention

The present inventors have developed a novel cosmetic composition, the innovation of which lies in obtaining a rigid, moldable and stable
20 structure, which is obtained by using a combination of two structural agents, namely a polymer with a specific structure and an agglutinant.

This rigid, moldable and stable structure is composed of a straight-chain aliphatic hydrocarbon with structural properties, and more specifically a polymer. This polymer is obtained by means of a polymerization
25 process, controlled so as to ensure that its chain will be totally straight, without branches at the polymeric chain.

A polymer specially useful for the present invention is the totally saturated polyethylene with a molecular weight ranging from 300 to 700 and, more preferably, a saturated linear polyethylene with a molecular weight of
30 approximately 400.

Together with the saturated linear polymer mentioned above, the solid cosmetic composition of the invention comprises an agglutinating agent

for that polymer. In order for the resulting structure to have a stable form, it is necessary to use such an agglutinating agent, which, combined with said polymer, provides the desired moldability, as for example, the shape of a bullet in a stable stick. This agglutinating agent is a glyceride, formed by glyceryl esters and behenic acid, and preferably the triglyceride of behenic acid,
5 known as Tribehenin.

It should be pointed out that some agglutinating agents used in cosmetic compositions and more particularly in lipsticks are mixtures containing glyceryl behenate and glyceryl dibehenate, which renders the composition unstable, polyethylene waxes, which provides the so-called lipstick bullet
10 with a soft consistency, and esters such as triisostearoyl citrate, which provide an oily feeling on the lips.

Tribehenin may be used in cosmetic compositions as an occlusive skin conditioning agent, suspending agent, gel forming agent and as a brightener. When used in the present invention, its function is structural and
15 as an agglutinating agent for a totally linear and saturated polymer.

Thus, a stable cosmetic composition with only two structural agents is obtained, without adding any type of mineral, vegetable and animal wax, more specifically natural waxes, or oils, which would make the product
20 "heavier".

The saturated linear polymer is usually employed in a range of 2 to 20% by weight, based on the total weight of the composition. On the other hand, the agglutinant agent is advantageously employed in a proportion ranging from 3 to 15% by weight, also based on the total weight of the composition.
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Since the structure of the composition is predominantly composed of a structural agent having a totally straight and saturated chain, this composition has an ultrafine texture and provides a feeling of absence of products on the lips, because it combines extremely light and comfortable
30 structural agents that may be used with non-oily emollients, defining the so-called feeling of a "second skin".

In addition to the above-cited structural components, the compo-

sition of the invention contains other components that are usually employed in cosmetic compositions of this kind and that are determinative of the objectives of the invention. The composition may contain, for example, film forming agents, which provide greater fixation of the product and, in the case of lipsticks, help to prevent it from flowing into the upper and lower creases on the lips. For instance, the addition of dimethiconol fluoroalcohol dilinoleic acid, which is a film forming agent, promotes deaeration of the product in its manufacture, which is an additional technical advantage.

Compounds that inhibit oily characteristics of the composition may also be used, such as hydrogenated polyisobutene and isononyl isononanoate, in addition to compounds that provide treatment benefits such as maintenance of skin hydration and anti-free radical action. Examples of such compounds include spheres of marine biopolymers and vitamin E, respectively.

Specifically when formulated as a lipstick, the solid cosmetic composition of the invention may include compounds such as phenylethyl dimethicone, which promotes the achievement of luminosity on the lips, as well as ground dispersions in triisostearoyl citrate with the pigments having a reduced particle size, which provide a luminosity increase in the color of the product.

Chemical and physical sunscreens, in amounts sufficient to provide a sun protection factor (SPF) suitable for the final use, may also be added. In the case of lipstick, it is desirable for the sunscreens to be in an amount sufficient to provide a sun protection factor of at least 15.

In a preferred embodiment of the invention, the cosmetic composition comprises at least two film forming agents, more specifically trimethylsiloxysilicate dissolved in cyclomethicone and dimethiconol fluoroalcohol dilinoleic acid, which guarantees long duration of the product, as well as enhances the fixation of the composition without flowing into neighboring areas, such as eyes, lips, etc. Since dimethiconol fluoroalcohol dilinoleic acid is a compound having the property of reducing the surface tension, it eliminates the step of deaerating the composition during the process or manufacturing

and/or packing it.

As a demolding agent, a mixture of silicone oil and polyisobutene is used, more specifically polydimethylsiloxane and hydrogenated polyisobutene, which provide the appearance of the bullet with a satiny brightness, after the finishing process in packing the product, in order to provide the appearance which the consumer likes.

A composition prepared with the structural agents according to the present invention has a number of improved characteristics in comparison with analogous compositions of the prior art, namely:

- It has an ultrafine texture, which provides the feeling of absence of product after application thereof, be it on the lips, face, eyes, or elsewhere, leaving no oily or heavy feeling;
- It is a homogeneous film-forming composition, extremely light in weight and comfortable;
- It allows the product to slide in an intense way, without friction while it is being applied;
- It also provides color deposit in an intense way in the first application, when used in make-up products;
- It has a high refraction index, providing luminosity;
- It has long durability;
- It does not comprise toxic or irritating components.

Tables 1-4 illustrate examples of compositions formulated in accordance with the embodiments of the present invention, indicating their preferred components and appropriate quantitative ranges according to the final uses intended. All the concentrations indicated are defined as percentage by weight based on the total weight of the composition:

TABLE 1: Lipstick Composition

Components	Function	Concentration (%)
Phenylethyl dimethicone	Brightening agent	8 - 15
Cyclomethicone/Trimethylsiloxysilicate	Film forming agent	3 - 10
Hydrogenated polyisobutene	Emollient	10 - 20

Propylparaben	Preservative	0.01 - 0.10
Hydroxy butyl toluene	Antioxidant	0.01 - 0.10
Tribehenin	Agglutinating agent	3 - 15
Polyethylene	Structure agent	2 - 20
Isononyl isonanoate	Vehicle	10 - 30
Dimethiconol fluoroalcohol dilinoleic acid	Film forming and deaerating agent	1 - 5
Titanium dioxide	Sunscreen	0.1 - 2
Octylmethoxycinamate	Sunscreen	2 - 5
Benzophenone 3	Sunscreen	1 - 3
Active	Hydrating agent	0.01 - 1
Pigments (organic, inorganic, lacquers and mica)	Coloring agent	15 - 25
Triisostearoyl citrate	Emollient	5 - 20
Vitamin E	Anti-free radicals	0.1 - 1
Essence	Perfume	0.1 - 1

TABLE 2: Pot Molded Bright Lipstick Composition

Components	Function	Concentration (%)
Diisostearyl malate	Emollient	15 - 25
Triisostearoyl citrate	Vehicle	20 - 40
PVP/eicosane copolymer	Film forming agent	3 - 7
Propylparaben	Preservative	0.01 - 0.10
Hydroxyl butyl toluene	Antioxidant	0.01 - 0.10
Tribehenin	Agglutinating agent	3 - 15
Polyethylene	Structure agent	2 - 20
Octylmethoxycinamate	Sunscreen	2 - 5
Benzophenone 3	Sunscreen	1 - 3
Active	Hydrating agent	0.01 - 1
Pigments (organic, inorganic, lacquers and mica)	Coloring agents	1 - 15
Vitamin E	Anti-free-radical	0.1 - 1
Essence	Perfume	0.1 - 1

TABLE 3: Lip Protector Composition with Sun Protection Factor SPF 30

Components	Function	Concentration (5)
Dicapryl carbonate	Vehicle	35 - 55
Shea Butter	Emollient	1 - 6
PVP/eicosane copolymer	Film forming agent	2 - 5
Methylparaben	Preservative	0.01 - 0.20
Propylparaben	Preservative	0.01 - 0.10
Hydroxyl butyl toluene	Antioxidant	0.01 - 0.10
Tribehenin	Agglutinating agent	3 - 15
Polyethylene	Structure agent	2 - 20
Octylmethoxycinamate	Sunscreen	5 - 10
Benzophenone 3	Sunscreen	3 - 6
Butyl methoxy dibenzoyl methane	Sunscreen	2 - 5
Octyl triazone	Sunscreen	2 - 5
Vitamin E	Anti-free-radical	0.1 - 1
Essence	Perfume	0.1 - 1

TABLE 4: Stick-Base Composition**STICK-BASE FORMULATION**

Components	Function	Concentration (%)
Triglycerol-4 isostearate	Emollient	0.1 - 2
Dicapryl carbonate	Vehicle	15 - 25
Hydrogenated polyisobutene	Emollient	5 - 15
Stearyl dimethicone	Film forming agent	2 - 8
Silicone elastomer	Emollient	2 - 10
Nylon 12	Sensorial modifier	0.5 - 3
Micronized talc	Absorber	2 - 10
Modified starch	Sensorial modifier	5 - 15
Silica microspheres	Absorber	1 - 5
Mixtures of preservatives	Preservative	0.01 - 0.50
Methylparaben	Preservative	0.01 - 0.20
Propylparaben	Preservative	0.01 - 0.10
Hydroxyl butyl toluene	Antioxidant	0.01 - 0.10
Tribehenin	Agglutinating agent	3 - 15

Polyethylene	Structure agent	2 - 20
Butyl methoxy dibenzoyl methane	Sunscreen	2 - 5
Titanium dioxide	Sunscreen	10 - 15
Active	Hydrating agent	0.01 - 1
Pigments (organic, inorganic, lacquers and mica)	Coloring agents	2 - 12
Vitamin E	Anti-free-radical	0.1 - 1
Essence	Perfume	0.01 - 1

Examples

A lipstick composition as described above in Table 1 was subjected to a research, in which the product was tested by 120 volunteers for 7 days, with a use frequency of about 8.8 times. A few considerations are given below, where the values are averages on a concordance scale with 5 points at most:

- 4.8 points - it covers the lips in a homogeneous way;
- 4.6 points - it colors the lips at the first application;
- 4.7 points - it slides on the lips, transmitting a pleasant feeling of suavity;
- 4.4 points - the texture is light in weight like a plume;
- 4.4 points - it does not flow / it does not stain;
- 4.4 points - its color is not altered during use;
- 4.5 points - it has a differentiated, creamy and at the same time lighter emollience;
- 4.4 points - it protects one's lips;
- 4.4 points - it hydrates one's lips;

Comparative Example:

Eleven finished lipsticks were analyzed at the laboratories of the University of Campinas - UNICAMP and of the University of São Paulo - USP - São Paulo, Brazil, by Joeques, Nogueira and Cassiola, the samples being classified as follows:

- five packages containing compositions known from the prior art in the following color options: metallic wine color identified by the trade name

Éluard, metallic brown identified by the trade name Dali, red identified by the trade name Piano, golden identified by the trade name Techno, metallic rose color identified as "label-less" ;

- five packages containing compositions according to the present invention, as described in Table 1 in the following color options: metallic wine color identified by the trade name Georgette, metallic brown identified by the trade name Cetim, red identified by the trade name Mousseline, golden identified by the trade name Organza, metallic rose color identified as Cashmere;

- a sample of the raw material saturated straight-chain polyethylene identified as "MP em bala" (MP in bullet).

In addition to the above-mentioned finished lipsticks, the following have been analyzed:

- a sample labeled "Bala do batom novo" (novel lipstick bullet), which is a base composition for the lipsticks according to the present invention;

- a sample labeled "Bala do batom velho" (old lipstick bullet), which is a base composition for the lipsticks of the prior art.

TABLE 5 - "Lipstick Composition of Traditional Formulation"

Components	Function	Concentration (%)
Castor oil	Vehicle	10 - 50
Carnauba wax	Structure agent	1 - 5
Candelilla wax	Structure agent	5 - 10
Bee wax	Structure agent	1 - 6
Ozoquerite wax	Structure agent	0.1 - 1.5
Ceresin	Structure agent	1 - 5
Hydrogenated castor oil	Emollient	0.1 - 3
Lanolin oil	Emollient	2 - 7
Decyl oleate	Emollient	10 - 20
Glyceryl abietate	Emollient	0 - 3
Hydrogenated vegetable oil	Thickener	0.1 - 8
Polybutene	Compacting agent	0.1 - 15
Isopropyl myristate	Emollient	0.1 - 5

Vitamin E	Anti-free-radical	0.01 - 1
Glyceryl rosinate / octyldodecyl myristate	Film forming agent	0 - 5
Propylparaben	Preservative	0.01 - 0.10
Hydroxyl butyl toluene	Anti-free-radical	0.01 - 0.10
Titanium dioxide	Sunscreen	0 - 2
Octylmethoxycinamate	Sunscreen	0 - 5
Benzophenone 3	Sunscreen	0 - 3
Actives	Hydrating agent	0 - 1
Pigments (organic, inorganic, lacquers and mica)	Coloring agents	1 - 30
Essence	Perfume	0.1 - 1

The test further used an A4-size sheet of trade mark Vitro-skin:

1 - Description of the tests and results achieved

The finished lipsticks were separated in 5 pairs, each being composed of a lipstick of the invention and a lipstick of the prior art. Another pair was constituted by the samples labeled "Bala do batom novo" (invention = novel lipstick bullet) and "Bala do batom velho" (prior art = old lipstick bullet).

1.1 - Sliding tests:

Controlled sliding

Two pairs of lipsticks and the pair of "bullets" were tested. Each pair was slide-tested only once, vertically and simultaneously, on pieces of Vitro-skin of dimensions 7.2 cm X 1.5 cm at a speed of 0.5 cm s⁻¹ in a universal assay machine. Each piece of Vitro-skin was weighed before and after the sliding of the lipsticks. The sample masses deposited on these tests are indicated in Table 6 below.

TABLE 6: Sample masses deposited on the Vitro-skin substrate in the slide tests in a universal assay machine. Duplicates.

Lipstick	Deposited mass, g	
Old lipstick bullet	1.42	0.74
Novel lipstick bullet	2.38	1.92
Label-less (*)	1.27	1.70
Cashmere (**)	2.19	2.38

Éluard (*)	1.83	1.60
Georgette (**)	1.82	1.95

(*) lipstick according to the prior art

(**) lipstick according to the invention

5 One can see, in this table, that the masses of sample deposited on the Vitro-skin are significantly larger in the case of the sample "Bala do batom novo" (novel lipstick bullet) than for the "Bala de batom velho" (old lipstick bullet). This difference is very well repeated for the lipsticks "Label-less" and "Cashmere", and in a greater degree for the lipsticks "Éluard" and

10 "Georgette". Assuming that the lipsticks are obtained by formulation of the bases used in the "Balas" (bullets), one can perfectly discriminate the lipstick "Label-less" as coming from the base "Bala do batom novo" (novel lipstick bullet). The discrimination is not so good in the case of the lipsticks "Éluard" and "Georgette" and should be attributed to the differences in formulation.

15 Pieces of Vitro-skin with lipstick were mounted in a scanner by using a glass spacer, in pairs. Figures 1 and 2 are the images obtained. These figures show well the differences in the amount of product deposited in each case, concordant with the gravimetry data.

20 Other pieces of Vitro-skin were mounted between blade and tiny blade and photographed by stereomicroscope with dark field and illumination from below. Figure 3 exhibits images obtained by stereomicroscopy of the samples tested by controlled sliding with an increase of about 30 times. The results are arranged in the following way:

- at the top: "Bala do batom velho" (old lipstick bullet) on the left, and
- 25 "Bala do batom novo" (novel lipstick bullet) on the right;
- in the middle: "Label-less" on the left and "Cashmere" on the right;
- below: "Éluard" on the left and "Georgette" on the right.

30 Just as in the scanner images, the differences in spreading are clear. With this greater increase one can note indicia of difference in the microstructure of the samples, which are confirmed in an analysis by SEM (scanning electronic microscopy).

1.2 Topography analysis by scanning electronic microscopy

The samples obtained in the controlled-slide tests were observed under an electronic microscope JEOL JSM 840 A, at the Laboratory of Electronic Microscopy of the Institute of Physics of the University of São Paulo - USP. A piece of dimensions 4 mm X 7 mm was taken from each sample.

5 These pieces were fixed with a double-face tape to the sample-holder and covered with gold by sputtering. The microscope was operated at 25 kV and current of 6×10^{-11} A. The image recording was made on a white-and-black 135-mm photographic film, by using a photographic camera coupled to the SEM. Figures 5-9 are representative of the observations made with SEM.

10 Figure 4 shows the appearance of the Vitro-SkinTM under the optical microscope, incorporated herein only as an illustration. This is a quite homogeneous material in these enlargements, with roughness. Figure 5A shows the topography of the Vitro-SkinTM (upper), in which the surface roughness is better characterized in comparison with the sample "MP em bala" - MP in bullet (lower).

15 Figure 5B shows the aspect of the sample "MP em bala" (MP in bullet) manually spread on the Vitro-SkinTM. It can be noted that the product spreads over the substrate, leaving particle aggregates in a quite irregular way.

20 The micrographs A and B in Figure 6 show the samples "Bala do batom velho" (old lipstick bullet) and "Bala do batom novo" (novel lipstick bullet), respectively, on the Vitro-SkinTM. Both micrographs are strictly in the same enlargement. The spreading observed for the "Bala do batom velho" (old lipstick bullet) exhibits particle agglomerates of a greater size. The particles are rounded, providing a little-defined microstructure. The sliding between the different layers during the spreading seems to be not much uniform. The spreading observed for "Bala do batom novo" (novel lipstick bullet) shows greater uniformity. The particles are smaller, better defined and also form agglomerates of smaller size. These agglomerates present good cohesion with each other, providing greater uniformity of spreading. In bigger enlargements, not photographed, one can observe that the microstructure of the novel base has a higher level of structuring among the particles.

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The observation of the spreading on the Vitro-SkinTM of the samples of the finished lipsticks has shown results similar to those presented in the micrographs A and B in Figure 6. In Figure 7A ("Label-less"), one notes lesser structuring of the sample and the formation of a thinner layer after the spreading than in Figure 9B ("Cashmere"). In Figure 7B, one again notes greater uniformity of the spreading.

The micrographs of Figure 8 exhibit an enlargement twice as big as that obtained for the micrographs of Figure 7, the samples being the same. These micrographs confirm what was shown in Figure 7. The sample of Figure 8A has less structured microstructure and seems to spread in thinner layers (although the spreading has good cohesion among the particles) than in the sample of Figure 8B.

The pair of micrographs presented in figure 9 shows more clearly the differences observed before. Figure 9A presents spreading on the Vitro-SkinTM of larger particle agglomerates, spreading in a less regular way and with less structuring. Figure 9B shows smaller agglomerates, but evenly spread and particles having a more defined shape, more structured and with good cohesion among themselves.

2 - Conclusions

The sliding tests show that there are significant differences between the lipsticks tested for the covering of the Vitro-SkinTM substrate. In all the cases, the finished lipsticks comprising compositions according to the invention cover the substrate more evenly.

The gravimetry tests show that these differences may be attributed to the nature of (said) bases. The "Bala do batom novo" (novel lipstick bullet) deposits about twice as much product as the "Bala do batom velho" (old lipstick bullet) on the substrate in a single passing with controlled speed and force.

The tests with scanning electronic microscopy show that the microstructure of (said) bases is different, after spreading on the Vitro-SkinTM. The "Bala do batom velho" (old lipstick bullet) spreads with formation of bitter agglomerates, with little structuring, but with good cohesion among the parti-

cles. The "Bala do batom novo" (novel lipstick bullet) spreads more densely and more evenly, with formation of smaller agglomerates, exhibiting a better structuring. The differences in structuring are also observed for the finished lipsticks. After having been spread, the finished lipsticks from the "Bala do batom novo" (novel lipstick bullet) exhibit a much more uniform microstructure than the lipsticks from the base "Bala de batom velho" (old lipstick bullet).

Thus, the larger and better spreading of the lipsticks according to the present invention with respect to the lipsticks of known composition of the prior art may be directly related to the different microstructure of the respective bases.